

One Tiny Vial Holds New York's \$250,000 Worth of Radium

This Rare Element Is Valued at More Than \$3,000,000 an Ounce

By Fred B. Pitney

THE market quotation for a gram of radium is \$120,000. So in getting two and one-quarter grams for \$250,000 and thus becoming the largest individual purchaser of radium in the world the State of New York got a bargain, as at the market price the cost would have been \$270,000. New York will use the radium in the treatment of cancer.

So few people are in the habit of measuring in grams that the foregoing statement in regard to the price of that much radium does not mean much to the ordinary man. The atom is as hard to visualize as infinity. Let us try to make a comparison that will mean something to a man up a tree.

Gold is worth \$20.57 an ounce at the mint. There are 28.35 grams in an ounce. Radium is worth at the market quotation \$3,402,000 an ounce.

Gold Mining and Profit

Gold mining pays according to the location of the mine and the facilities at hand for extracting the ore. The famous Homestake Mines paid 50 per cent a month for many years on \$2 ore; that is, ore that contained one-tenth of an ounce of gold a ton. Other mines will not pay on anything less than \$20 ore—ore that carries one ounce of gold a ton. There must be wood and water conveniently at hand, a mill on the property for crushing and concentrating low grade ores with the gold in combination, not too long a haul to the railroad, not too long a haul by rail and enough iron, lead and silica in the ore so that the smelter charges will not eat up all the profit.

Gold mining is not an absolutely simple proposition. There are not many places on the desert where gold mining will pay with \$5 ore. But radium mining will pay big in the middle of the desert, with a fifty-seven-mile haul to the railroad over treacherous roads deep in sand, and ore that runs one one-hundredth part of an ounce of radium to the ton is sacked and shipped without a pretense of concentration.

Pocket hunting for gold is a losing proposition on the desert. There are places in the high Sierra Nevada and in the Coast Range and some spots in the mountains of Oregon where pocket hunting, besides being an entrancing game, pays the lone prospector rather well, with a fair proportion of luck on his side. But pocket hunting for the hard rock

miner, tunneling and drifting through faulty ground, is poor business.

A Pocket Hunter

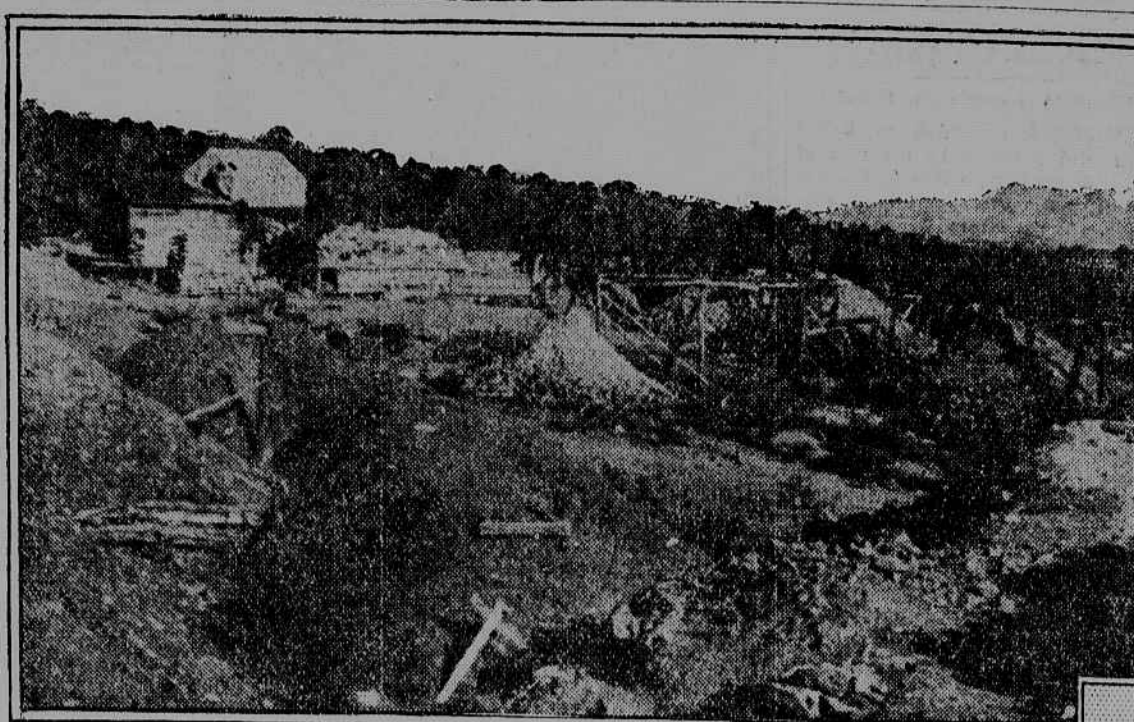
Yet the radium miner is essentially a pocket hunter. When Mme. Curie first discovered radium the only source known for the new element was pitchblende, which is found in pockets in gold and silver mines, chiefly in Europe—Bohemia and Silesia. The quantity of radium in pitchblende is proportionately so minute and the pockets are so small that up to half a dozen years ago the extraction of radium was a laboratory operation and there was nothing commercial about it. Radium was a curiosity and a subject for laboratory experiment. Six or seven years ago radium was discovered in carnotite, a vanadium ore carrying a small percentage of uranium. Radium is in combination with the uranium in carnotite, and the discovery made radium mining a business.

The most extensive deposits of carnotite known are in Paradox Valley, in southwestern Colorado. Paradox Valley is so called because a small stream of water crosses the valley perpendicularly to its axis instead of running down the length of it. Where the stream rises or where it goes to has not yet been discovered. It seems to be one of those streams peculiar to the desert country, a section of an underground watercourse that rises to the surface without apparent cause and after flowing a few miles in the open sinks again into the sand without rhyme or reason.

The geological formation of Paradox Valley is faulted sandstone. Fossil trees, some of them of enormous size, found in the sandstone seem to place it in the carboniferous age. No fish or animal fossils have yet been found. This sandstone formation runs from the southeast to the northwest, crossing the Colorado line into Utah, with the carnotite deposits reaching their greatest width in Paradox Valley. The carnotite lies in pockets in the sandstone, ranging from twenty to sixty tons in size. The faults in the sandstone, combined with the pockets of carnotite, have led to the theory that the district has been subject to volcanic action, during which the rock strata have been faulted and the carnotite deposited in the seams and pockets opened up.

Deposits Explained

On the other hand, the series of mountain ranges lying between the



A RADIUM mine in the Paradox Valley, in Colorado

Rockies on the east and the Sierra Nevada on the west are clearly the result of pressure, a folding of the earth's surface. This would suggest that the faulting of the Colorado sandstone was due to pressure instead of to volcanic action and that the seams and pockets were opened up by the folding. After this had taken place molten matter, or, perhaps, gases escaping from the interior of the earth, condensed and hardened in the pockets of the sandstone and thus the carnotite deposits were formed in Paradox Valley. There may have been a secondary folding, or there may have been a degree of volcanic action or pressure, as there is evidence of double faulting, but signs of metamorphism of the sandstone by volcanic action are lacking.

The Colorado carnotite carries a high proportion of vanadium and about 2 per cent of uranium. As the company working the deposits is mining radium, the vanadium, which is an important alloy for steel, is saved as a byproduct, while the uranium is reduced to extract the radium and the uranium itself is thrown on the slag pile. One milligram of radium can be extracted from eight pounds of uranium. Therefore, the sale of two and one-quarter grams of radium for \$250,000 to the New York State Institute for Malignant Diseases meant mining and sacking 450 tons of carnotite in Paradox Valley, Colorado, hauling the ore by mule teams fifty-seven miles to the railroad, loading it into twenty-one freight cars and transporting it by rail to East Orange, N. J., to be reduced.

From 408,210,000 grams of carnotite ore all messed up together two and one-quarter grams of radium had to be picked out.

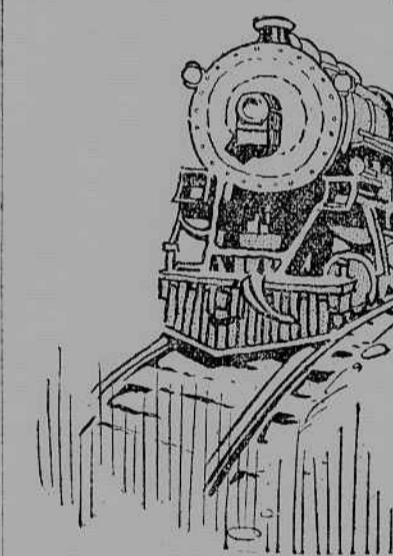
Successor of the Alchemists

Transmutation of metals is an ancient stunt. It was what kept the alchemists of the Middle Ages busy. They had two main lines of endeavor, the search for the philosopher's stone and the search for the combination that would change base metals into gold. Poisoning was a side line, but, like the modern packing industry, it was the side line that paid dividends.

Nowadays there are still a few followers of the medieval alchemists. Every once in a while some seedy individual wanders into a busy office in the financial district and produces a few grains of gold that he claims to have made from a scrap of zinc by a secret process that he will sell for a fabulous sum—or he will accept a loan of 50 cents. Nevertheless, it is agreed by metallurgists that as a practical proposition

the transmutation of metals is a come-on game.

And yet Nature from time to time is still able to produce a wonder that man with all his science cannot equal. She has done it with radium. In 3,600 years all the radium now in



IN the little vial Dr. S. A. V. Sochocky holds with a pair of tweezers is all the radium that is yielded by twenty-one carloads of ore

the hands of man will be just common, ordinary scraps of lead. Nature is effecting the transmutation of metals. Moreover, radium always being found with uranium, scientists think, although they can't prove it, that radium is a transmutation of uranium.

This only begins the curious things



that radium does. It is the only light, but is without penetrative power. The Beta ray comprises 10

giving off energy without taking anything in. From the moment it is segregated, radium begins to give off energy and has a delicate sky-blue luminosity. Three and eight-tenths days later it has reached 50 per cent of its full power and at the end of thirty days it is 100 per cent efficient. At that time its luminosity has faded 75 per cent. It continues to give off power for 3,600 years, irrespective of the size of the morsel, and then it is lead and as dead as any other piece of lead.

Radium's Energy

Radium's energy is given off in three rays, known as the Alpha, Beta and Gamma rays. The first two rays are electrical and the third is not really a ray, but a vibration. The first ray comprises 85 per cent of the activity of radium and travels with approximately the speed of

New York, by Its Recent Purchase, Becomes One of World's Largest Radium Owners

per cent of the activity, travels with about one-fifteenth the speed of light and can penetrate from two and a half to three centimeters of lead. The Gamma ray is a hard vibration that makes up the remainder of radium's activity and can penetrate from seven to eight centimeters of lead.

No use has yet been found for the Alpha and Beta rays of radium beyond making objects luminous in the dark. It is the combination of the three rays that seems to cause the luminosity, while when the Gamma

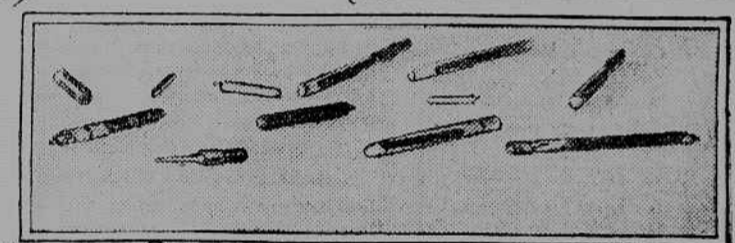
trative power, will not burn, but in the use of radium in hospitals the Beta ray has to be carefully guarded against or it will cause severe burns. The patient is protected from it by screens that absorb the Beta ray. The Gamma ray seems to have the peculiar quality of picking out useless or harmful tissues against which to exercise its first activities. It will burn out or dissolve the useful tissues only after the harmful tissues have first been disposed of.

Why Radium Cures

There are two ways of handling radium for curative purposes. One way is in the form of radium sulphide, in which case the particle of radium is brought in juxtaposition to the part to be treated, and the other way is in the form of radium bromide. In this method emanations from the radium bromide are bottled up in suitable quantities. Their gain and loss of strength are directly opposite to those of radium. They reach their maximum strength three and eight-tenths days from their inception and at thirty days have only 50 per cent of strength.

Claims have been made that the X-ray and radium rays are identical. It has been found, however, that while light, radium and the X-ray have their separate spectra, when the rays are passed through rock salt the spectra of radium and light are almost identical, while the X-ray still retains a spectrum peculiar to itself.

Radium is handled in glass tubes heavily incased in lead containers. Those who have to use it constantly find that they usually get pretty badly burned sooner or later. On the average, a bit of radium in its glass tube can be held in the hand for about ten minutes without bad effects, but once radium has inflicted a burn there is nothing to be done about it. The flesh, or even the bone, if the ray penetrates that far, is destroyed. It dissolves or something else happens to it that makes it disappear and cease to



THESE vials, each no larger than a match, contain radium worth \$350,000

exist. It is not merely the case of a burn that will heal and the scar of which will finally disappear. There is nothing left to heal. And the longer one handles radium the more susceptible one is to its effects. One does not become accustomed to it and more or less immune. Also, it is a bad thing to look too much at radium, as the sight may easily be affected by the rays.

While the Alpha and Beta rays of radium are electrical, no way has been found to use their energy for power, and it is not believed that they could be utilized in that way, even though great masses of radium should be produced and collected in one place. Their energy does not seem to be of a nature that can be transformed into power, nor is there an increase of energy or of power with added size.

policies of a great nation. Get right at home first; then branch out.

"Political economy first, last and always.

"Take the appointive power away from the President and governors and vest that power in the people.

"That makes a democracy out of an autocracy.

"The initiative, referendum and recall will put the political grafters out of commission.

"Select a national commission from the descendants of pre-Revolution settlers, which guarantees a genuine American body.

"Women's votes are going to decide all contests for wisdom, righteousness and economy. — R. M. Hanks.

"Recommend only Americans for office, and you have the problem solved.

"Taxation on the plan of Henry George would revolutionize our industrial advantages a thousandfold.

"Any taxpayer can well afford to pay \$5 for membership in a proposition of this kind.

"JOIN WITH US NOW."

The failure of a convention of uplifters to select any of these strikingly original and forward-looking candidates may well seem almost inexcusable.

Your Political Moses Is No Shrinking Violet

THE convention recently held in Chicago under the auspices of the Committee of Forty-eight to devise ways and means of freeing the American people from the shackles of political and economic servitude was organized along extremely generous lines. Such reactionary formalities as credentials and elections were contemptuously brushed aside in the case of the delegates. Any idealist who possessed the railroad fare to Chicago and a plan for redeeming the world was able to attend the convention, to vote, and to participate in its proceedings. As a result a number of very extraordinary Presidential booms were launched.

Perhaps the most picturesque of the candidates who appeared on the scene was David S. Beach, of Bridgeport, Conn. Mr. Beach was evidently a firm believer in the virtues of advertising. He distributed broadcast large sheets of paper, on which his picture appeared side by side with those of Washington and Lincoln. Above the three pictures was the caption, "The Big Three." Beneath, the following words were printed in varying sizes of type:

The Man Is Born

"Real and Positive Promoters of Americanism. It required 111 years to produce Lincoln's successor, 188 years George Washington's great ideal dream of American liberty. Beach will be the People's President of the United States in 1920. The MAN is born. Voters. The rest is up to you. Go to it, and Do Your Duty."

Mr. Beach sees himself as a favorite son. He says:

"Let Bridgeport or the State of Connecticut Have the Greatest Honor for Supplying the Greatest President the World Has Ever Known."

Later he adopts as his slogan:

"A Connecticut Nutmeg in the Presidential Ring. He is not made of wood, either."

The last line of his appeal reads: "Voters, Make Beach Your President and you may yet live to see

'Easy Street'; if not, Financial Slavery Is Ahead."

Mr. Beach did not base his candidacy solely or even chiefly upon the fascination of his personality. Announcing himself as David S. Beach, President and Actuary of The World's Liquidating and Refunding Company of the World, Inc., 1911, and capitalized at \$1,000,000, he appealed strongly to the voters on the issue of frenzied finance.

Without Taxes

Far be it from any ordinary mind even to attempt to analyze Mr. Beach's startling scheme for the readjustment of the nation's currency system. It boldly promises to pour unlimited wealth into the Treasury without imposing a cent of taxation. Just how this most desirable object is to be achieved is explained, down to the most minute details, in long tables where Mr. Beach plays with millions and billions to his heart's content and secures some amazing results in addition and subtraction.

Mr. Beach possesses an eminently single-track mind. A delegate who was interested in his candidacy said to him:

"Mr. Beach, in the event of your election, what will be your Russian policy?"

"I shall offer the Russian people my plan, the greatest plan ever devised by the mind of man," replied the candidate.

"But supposing they refuse to accept it?" said the delegate.

"But they can't refuse it," observed Mr. Beach. "If they put up a hundred men to argue with me they couldn't get a better plan."

"But what if they still reject it?" persisted the delegate.

"Then," declared Mr. Beach, with the evident idea of casting the obstinate Russians into outer darkness, "then I will just leave them to shift for themselves."

One of Mr. Beach's closest rivals was Samuel G. Priddle, who set forth his claims for the nomination in a little booklet filled with Scriptural texts. Apparently Mr. Priddle was inclined to revive the theory of the divine right of kings. On the

cover of his booklet appeared the words:

"Elected by the king of presidents. The elect prophetic Bible movement. Telegrams from heaven. Bible evidence. 935 W. Van Buren St."

Mr. Priddle declares that "twelve United Abiding Sane Saints will soon convert the world. This is according to very strong evidence; and also as soon as twelve become of one mind we shall receive power from the king of kings to rule U. S., and then some."

The Imperium of Democracy

Another dark horse at the convention was Charles N. Haskins, author of a pamphlet entitled "Chart of the Imperium of Democracy: A Chart and Compass for the Ship of State." Mr. Beach was inclined to consider currency the vital issue of the campaign, while Mr. Priddle laid stress upon religion. Mr. Haskins displayed a more political bias. He gives the following lucid definition of his ideal of government:

"The preferendum, initiative, referendum and recall vitalized and made practical for full and absolute expression of a freeman's will by means of the concentratum."

Mr. Haskins is more fortunate

than his rivals in being provided with a campaign song, of his own composition. It runs as follows: The politicians are in power, the people in the soup;

To politics as she is run no longer will we stoop.

Then on the job we all will go to clean the stables out, Corruption put upon the dump and politicians rout.

The concentratum we will have, the preferendum, too, And legislation most direct, recall for the untrue.

Then will we have democracy in truth as well as name, The people then will be in power, laws all for all shall frame.

Mr. Haskins sums up his conception of government by the graphic method of a diagram. In the center of the diagram is the inspiring phrase: "The Foundation of the Temple of Liberty." As supporters of this foundation he lists the concentratum, wall of resistance to destructive anarchy, direct legislation, wall of resistance to autocracy and dictatorship, wall of resistance to ignorance and indifference, the preferendum, wall of resistance to privilege and corruption, and the recall.

In another leaflet Mr. Haskins exhorts every one to "Buy, Read and Boost the Chart and Plan of the Equidom, Independum, or Folk-

Imperium, and Become Independent Politically and Economically, Individually and Collectively." He appends this glowing description of the merits of the Equidom: "A NEW DECLARATION OF INDEPENDENCE and Charter of Human Liberty. A sure guide to freedom, equity, progress, prosperity and brotherhood. Genuine democracy demonstrated and real republicanism realized. Democratic and representative government correctly correlated and efficiently executed. Bosses bounced, corruption crushed, traitors treed. The nations saved from autocracy, plutocracy and mobocracy. Opportunity opened to all on equal terms. Labor liberated, capital stabilized, wealth conserved. Worth billions to humanity. A priceless boon to each. Emancipation from wrong conditions within your reach."

Three for \$2

And this priceless charter of human liberty and progress is offered for sale at "only \$1.00—3 for \$2.00."

Another champion of the masses against the grasping instincts of accumulated wealth is William H. ("Coin") Harvey. Mr. Harvey makes his appeal through a publication entitled "Common Sense." There is,

however, an alternative title, which expresses the crusading spirit of the magazine more effectively: "The Clot on the Brain of the Body Politic." Mr. Harvey is one man who still believes firmly in free silver as a panacea for the nation's ills.

On the cover of the magazine is a picture of the Statue of Liberty, threatened by strokes of lightning labeled Usury, Strikes, Covetousness, Crimes, Profligate Wares, Discontent and Restlessness. In bimetalism Mr. Harvey sees a remedy for all these misfortunes. In the prologue to the pamphlet the author strikes a pessimistic note:

Before It's Too Late

"It is fair to presume that some evil trait in human character, resulting in an economic poison in the construction of government and society, is the cause of the death of the civilizations that have preceded us.

"What is contained in this pamphlet, learned at the proper time, before the fatal poison has gone too far, may save and help in the building of a civilization to come that will be permanent here on earth.

"At the time this is written it is a fair presumption that it is now too late to save this civilization. In an era of political, mental and moral

ray strikes a hard substance it breaks up into two rays corresponding to the Alpha and Beta rays. It is the Gamma ray that is used in bloodless surgery.

The Alpha ray, having no pene-